CLAIM(S)

1. A method of decoding data comprising:

receiving a signal comprising a plurality of bit patterns at a bank of equalizers, each equalizer in the bank of equalizers tuned to a bit pattern with a corresponding equalization target;

generating pattern dependent outputs from the equalizers; and

calculating an estimated bit sequence with a detector using the pattern dependent outputs.

2. The method of claim 1 wherein the signal is received from a recording channel.

3. The method of claim 1 wherein the step of receiving comprises:

reading a sequence of signal samples from a channel; and

passing segments of the sequence of signal samples to the bank of equalizers one segment at a time.

4. The method of claim 1 wherein the step of calculating comprises:

calculating a path metric for every possible state transition sequence using the pattern dependent equalizer outputs according to transition information; and

selecting a bit sequence corresponding to a path having the smallest accumulated path metric.

5. The method of claim 1 wherein each equalizer includes a pattern-dependent filter.

6. The method of claim 1 wherein each equalizer includes an adaptive algorithm for tuning each equalizer to a bit pattern during use.

7. A method of decoding data comprising:

processing a segment of a received signal in a bank of equalizers, each equalizer tuned to a bit pattern and an equalization target to produce an equalized output for each equalizer; and

detecting a bit sequence using a branch metric calculation to process the equalized output.

8. The method of claim 7 wherein the step of processing comprises:

dividing the segment of the received signal into finite overlapped segments, and

calculating an equalized output for each of the finite segments with the bank of equalizers.

9. The method of claim 7 wherein the equalized output is used in sequence detection according to the bit pattern associated with the equalizer.

10. The method of claim 7 wherein a number of equalizers in the bank of equalizers is determined by a maximum number of possible states for a selected pattern window.

11. The method of claim 7 wherein before the step of processing, the method further comprising:

tuning each equalizer in the bank of equalizers to a bit pattern.

12. The method of claim 11, wherein the step of tuning comprises:

selecting an equalizer from the equalizer bank;

sending known data to the selected equalizer to calculate a target output signal;

calculating a difference between an output signal from the selected equalizer and the target output signal; and

tuning the selected equalizer to minimize the difference.

13. The method of claim 7 wherein the branch metric calculation is a square of a difference between a received signal sample and a desired target signal determined by a state transition.

14. The method of claim 7 wherein the equalization target is pattern-dependent.

15. The method of claim 7 wherein the branch metric calculation is based on a noise whitening principle when noise in the received signal is correlated.

16. The method of claim 7 wherein the branch metric calculation is based on a covariance matrix of noise when noise in the received signal is correlated.

17. A system for reading and writing information on a channel comprising:

a transceiver adapted to read data from the channel and to write data to the channel;

equalizers in communication with the transceiver adapted to generate an equalized output representative of a signal read from the channel, the equalizers adapted to process the signal, each equalizer tuned to a selected data pattern and equalization target; and

a detector in communication with the equalizers adapted to detect data from the read signals.

18. The system of claim 17 wherein the detector is a maximum likelihood sequence detector, the detector is adapted to select a smallest accumulated path metric for the signal read from the channel relative to every possible state transition sequence.

19. The system of claim 17 wherein the transceiver is a read/write head of a storage device.

20. The system of claim 17 and further comprising:
a tuner adapted to tune the filter to the selected bit pattern.

21. The system of claim 17 wherein a number of equalizers is determined by a maximum number of possible states for a selected pattern window.

22. The system of claim 17 wherein the detector is adapted to calculate a branch metric based on a square of a difference between a received signal sample and a desired target signal determined by a state transition.

23. The system of claim 22 wherein the branch metric is based on a noise whitening principle when noise in the received signal is correlated.

24. The system of claim 22 wherein the branch metric is based on a covariance matrix of noise when the noise in the received signal is correlated.

25. The system of claim 17 wherein the equalization target is pattern dependent.

26. A method for detecting data comprising:

tuning each equalizer in an equalizer bank to a data pattern according to a target equalization pattern;

processing segments of a received signal with the equalizer bank to generate equalized output signals;

calculating a path metric for each possible data sequence; and

producing an estimated bit sequence based on the path metric with a smallest accumulated path.

27. The method of claim 26 wherein tuning comprises:

selecting an equalizer from the equalizer bank;

passing a known signal segment to the selected equalizer and to a target function;

comparing an output of the selected equalizer with the target equalization pattern of the target function; and

adjusting the selected equalizer relative to the target equalization pattern.

28. The method of claim 26 wherein processing comprises:

dividing the received signal into segments; and

equalizing each segment with the equalizer bank to produce an output signal corresponding to the received signal.

29. The method of claim 26 wherein the target function is pattern dependent.